

REMARKS

Claims 1 – 18, 25 – 31, 36 – 42 are currently pending. Claims 19 – 24 and 32 – 35 have been cancelled without prejudice. Claims 3, 4, 25, and 36 have been amended to correct dependency. The transition phrase of Claim 1 has been amended, without prejudice, to replace “comprising” with “consisting essentially of”.

INFORMATION DISCLOSURE STATEMENT:

Applicants thank the Office for considering, as initialed by the Examiner, the documents listed on previously submitted Form PTO-1449. Of the documents listed on the Form PTO-1449, three patents were inadvertently mis-numbered. A supplemental IDS identifying the correct number of these three patents is being re-submitted for the Office’s consideration.

Applicants are also submitting an English-language translation of JP 4-110388 for the Office’s convenience and consideration.

CLAIM OBJECTIONS

Applicants have noted the Office’s objection to claims 3 and 4 as failing to further limit the subject matter from a previous claim. As per the Examiner’s suggestion, these claims were amended to depend from claim 1. The Office’s objection to claims 3 and 4 is therefore moot.

REJECTION UNDER 35 U.S.C. § 102(b)

The Office has rejected claims 19 – 24 and 32 – 35 under 35 U.S.C. § 102(b) as being anticipated by JP 4-110388. In order to expedite the prosecution of this application, these claims have been cancelled without prejudice. The Office's rejection under § 102(b) is therefore moot.

Applicant specifically reserves the right to file a continuing application which may include these claims as well as claims directed to non-elected inventions.

REJECTION UNDER 35 U.S.C. § 103(a)

The Office has rejected claims 1 – 42 under 35 U.S.C. § 103(a) as being obvious over JP 4-110388 in view of US 5,370,812 (Brown) and/or US 5,254,280 (Thomas).

In particular, the Office has stated that JP 4-110388 discloses that 1,3,3,3-tetrafluoroethylene (HFO-1234ze) is useful as a heat transfer fluid and that it is soluble in unspecified refrigeration lubricants. The Office further states that Brown discloses that polyalkylene glycol, polyalkylene glycol esters, and polyalkylene glycol ethers are useful as lubricants with hydrofluorocarbon refrigerants. The Office then concludes that one skilled in the art would readily recognize that the lubricants taught by Brown could be applied to the refrigerant taught by JP 4-110388.

However, a careful reading of JP 4-110388 indicates that the patent does *not* teach that common refrigeration lubricants are miscible in hydrofluoroolefins (e.g. HFO-1234ze), but in fact that such lubricants are miscible in hydrofluoroalkanes (e.g. R-22, R-32, R-124, R-125, R-134a, R-142b, R-143a, and R-152). Such hydrofluoroalkanes may, in turn, be added to a hydrofluoroalkene to improve the solubility of the refrigerant

mixture in a lubricant. At page 3 of the English translation of JP 4-110388, the authors state: “In the case of using this mixture [of a hydrofluoroolefin and a lower hydrofluoroalkane] ... it is possible to improve the performance factor or to improve the solubility with the refrigeration machine oil” Thus, the Office’s statement that “the JP teaches that 1,3,3,3-tetrafluoroethylene is miscible with refrigeration lubricants” is misplaced. In fact, JP 4-110388 provides no teach or suggestion whatsoever of a refrigerant consisting essentially of a hydrofluoroalkene such as HFO-1234ze and a lubricant. Instead, this patent merely reiterates what is already known in the art – that is, lubricants such as PAG are miscible in common lower hydrofluoroalkane refrigerants.

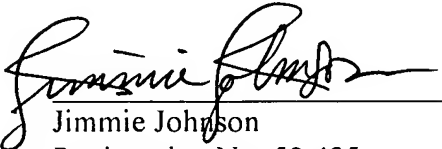
This teaching is exemplified by Brown which discloses that compounds such as PAG can be used as lubricants for lower hydrofluoroalkanes. Like JP 4-110388, Brown offers no teaching or suggestion that such lubricants are miscible with hydrofluoroolefins such as HFO-1234ze. Thomas, likewise, lacks any teaching or suggestion that PAG or other lubricants can be used in systems comprising hydrofluoroolefins refrigerants. There is simply nothing in any of the references cited by the Office that would motivate one skilled in the art to apply the lubricants taught in Brown or Thomas to a hydrofluoroolefin, let alone HFO-1234ze. The Office’s conclusion that such motivation exists is clearly based upon impermissible hindsight.

For at least these reasons, and in view of the above-mentioned amendments, the Office has failed to demonstrate that the claimed invention is obvious over JP 4-110388, either alone or in combination with Brown. Applicants therefore respectfully traverse the Office’s rejection under § 103(a).

The Office is invited to contact the undersigned counsel in order to further the prosecution of this application in any way.

Respectfully submitted,

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